NOVEMBER 2000 VOL 4, NO. 11

Reducing Slope Length for Erosion Control

Slope length and inclination are two factors that directly affect the tendency of a slope to erode and introduce sediment into storm water runoff.

Fiber rolls installed as a part of efffective erosion control.

Although contractors cannot deviate from embankment and slope inclinations specified in construction plans, there are storm water friendly methods available for shortening the effective length of a slope.

Best Management Practices (BMPs) for mitigating slope length make use of fiber rolls or gravel bag berms to build erosion control benches at specified intervals down the slope face. This strategy is effective at low surface velocity flows (< one cubic foot/second) for intercepting and filtering sediment from runoff. The decrease in velocity also reduces the concentration of sheet flows that create rills and gullies on slope faces.

Fiber Rolls to the Rescue

Fiber rolls are biodegradable materials rolled into tubes of varying lengths. Prefabricated fiber rolls constructed of rice straw, wheat straw, flax or similar material, can be purchased in diameters ranging from 200 mm to 300 mm. Fiber rolls can also be made in the field using erosion control blanket material rolled and bound with jute twine every 1.2 m along the length and at each end.

Details for installing fiber rolls are provided in the *Caltrans Storm Water Quality Handbooks, Construction Site Best Management Practices (BMPs) Guide (Site Guide)*, SC-5.

How to Use Them

While fiber rolls reduce erosion and sediment transport from disturbed soil areas (DSAs), their use may not be appropriate for all situations:

- Installation can be labor intensive.
- Fiber rolls are heavy and difficult to move when wet.
- Fiber rolls cannot be easily reused.
- Fiber rolls have a life span of two to five years depending on climate and fiber roll material.

For these reasons, fiber rolls are not as appropriate for short term protection of active DSAs, but are best suited for longer term protection of nonactive DSAs and completed DSAs to help stabilize the slope while vegetation establishes.

Gravel Bag Berms

An alternative to fiber rolls are berms constructed of gravel bags. Bags made from synthetic woven material or burlap are filled with ½ to 1-inch clean aggregate. The gravel bags are aligned end-to-end, tightly abutted, along a level contour to form a berm that creates the erosion control bench. Details for installing gravel bag berms are provided in the *Site Guide, SC-6*.

When to Use Them

The *Caltrans Storm Water Management Plan* and the *Site Guide* require the installation of fiber rolls or an equivalent BMP during the rainy season on all nonactive DSAs as follows:

- For slope lengths of 30 m or more with inclinations between 1:20 and 1:2, install fiber rolls or an equivalent at intervals no greater than 15 m.
- For slope lengths of 15 m or more with inclinations of 1:2 or steeper, install fiber rolls or an equivalent at intervals no greater than 7.5 m.

Why to Use Them

Fiber rolls and gravel bag berms provide minimal sediment removal and should not be used in place of linear sediment barriers. Likewise, their use does not replace requirements for soil stabilization measures.

Effective storm water management for slopes requires soil stabilization and sediment control measures. The use of fiber rolls and gravel bag berms are only one component of an effective overall erosion control strategy.

STORM WATER HOME